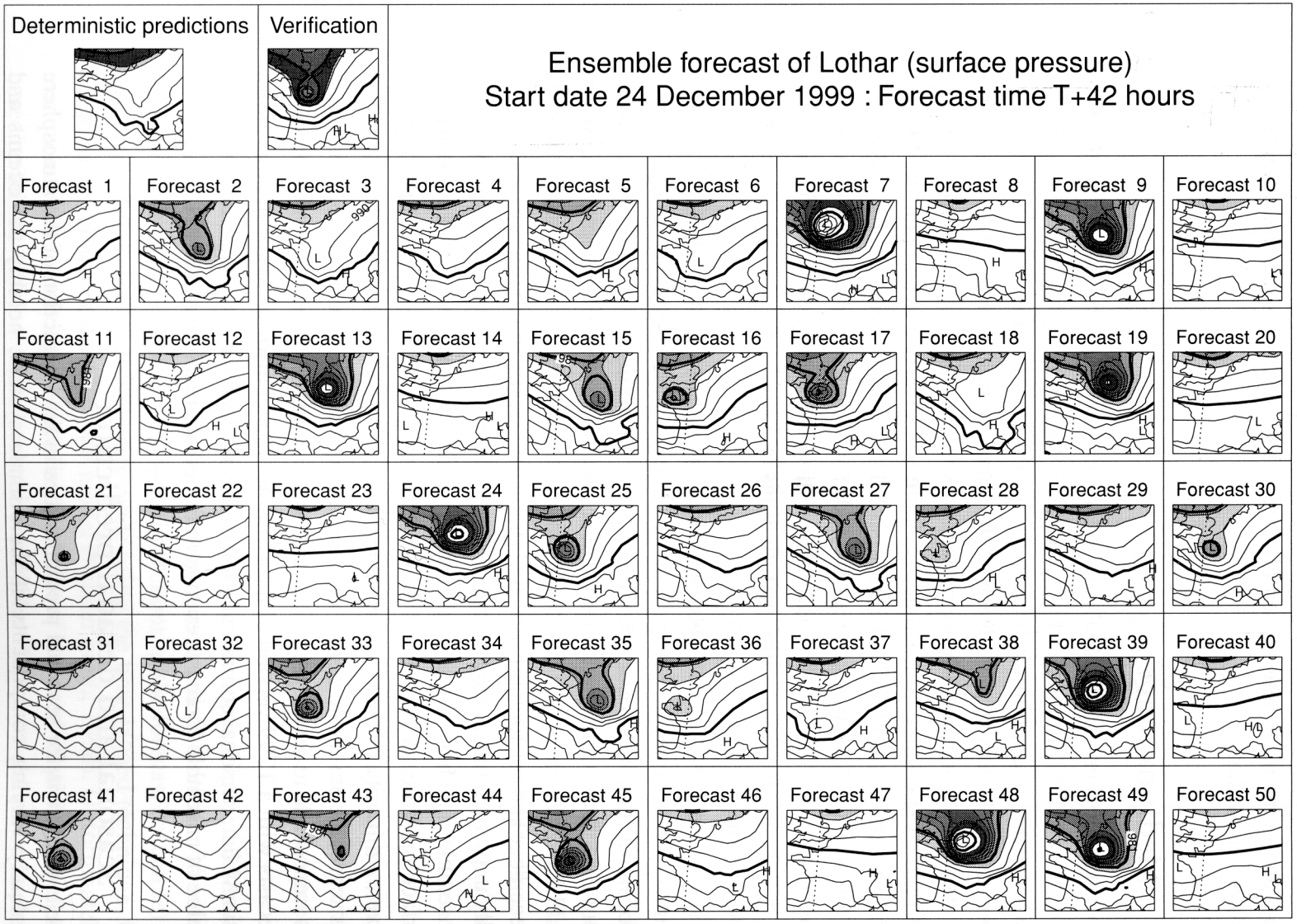
AMS short course on ensemble prediction



c/o Tim Palmer, ECMWF

AMS short course on ensemble forecasting

Professors of Theory:

Tom Hamill

(NOAA/ESRL, Boulder, CO)

Jim Hansen

(Naval Research Lab, Monterey, CA)

Maj. Tony Eckel

(USAF/AFWA, Omaha, NE)

David Bright

(*NOAA/NSSL, Norman, OK*)

Marina Timofeyeva

(NOAA/COMET, Boulder, CO)

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Professors of Real-World Practice

Tom Mahoney
(WFRV, Green Bay, WI)

John Toohey-Morales
(NBC Telemundo, Miami, FL)

(and you)

Motivation

National Academy of Sciences report, 2006:

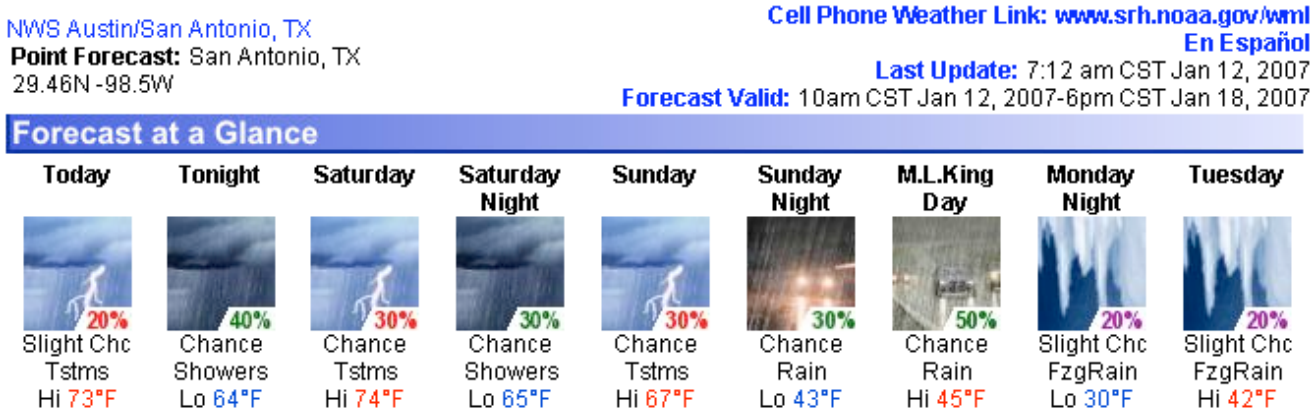
"*Uncertainty is … a fundamental characteristic of weather, seasonal climate, and hydrological prediction, and no forecast is complete without a description of its uncertainty*."

"*The entire enterprise should take responsibility for providing products that effectively communicate forecast uncertainty information*."

Source: "*Completing the Forecast*"
www.nap.edu/catalog/11699.html

Where we are, 2007

- 14 years experience now in ensemble prediction in the US
- Steady progress in making ensemble forecasts more useful and skillful.
- Increasing penetration of ensemble products into generation of, e.g., severe-storm forecasts, medium-range forecasts.
- BUT:
  - Public and many forecasters unused to probabilistic thinking
  - Many NWS products still deterministic
  - Penetration into mass communications minimal



Goals

- Show you
  - how probabilistic prediction is “value added.”
  - where we are we are in understanding the sources of forecast uncertainty and probabilistic weather prediction.
- Get some hands-on experience working with ensemble data, making a probabilistic forecast.
- Brainstorm together: how can we move toward realizing that NAS goal of communicating uncertainty?
- Feedback: what do you need from NWS?

Schedule

- **8:30** Arrival and introductions. (Tom Hamill)
- **8:45** Theory behind ensemble forecasting: chaos theory and its consequences for weather prediction. (Jim Hansen)
- **9:30** Basic concepts of probability and statistics. (Tom Hamill and Jim Hansen)
- **10:10** Break
- **10:30** Chaos forecast exercise. (Maj. Tony Eckel)
- **11:00** Ensemble forecasting, Part 1: How we make ensemble forecasts and how we verify them. (Tom Hamill)
- **11:30** Ensemble forecasting, Part 2: Problems with ensemble forecasts, and statistically correcting them. (Maj. Tony Eckel)
- **12:15** Lunch Break
- **1:15** Ensemble Forecasting, Part 3: Ways of viewing and interpreting ensemble forecasts: applications in severe weather forecasting. (David Bright)
- **2:15** Laboratory preparation: Discussing the case study, how to use web-based products. (David Bright)
- **2:30** Break
- **2:45** Ensemble forecast lab: using ensembles to improve your forecasts. (David Bright, assisted by the rest of us)
    - **2:45 – 3:30** Forecasters work in groups on making forecasts for several weather situations.
    - **3:30 – 4:00** Presentations by the groups.
- **4:00** Break
- **4:10** Examples of incorporating uncertainty into real-time forecasts of winter weather and tropical weather. (Tom Mahoney)
- **4:40** Panel Discussion / Brainstorm Session with audience. (Tom Mahoney and John Toohey-Morales)
- **5:00** Evaluations and conclusion